

Legal Case: Brain Abscess from Alleged Failure to Treat Periodontal Disease

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Submission: 📅 October 11, 2017; **Published:** 📅 November 14, 2017

Introduction

Dr.'s William S Spiegel, J.D. and Marc Leffler, D.D.S., J.D. discussed the unfortunate case of a 47 year old woman who developed a brain abscess due to untreated periodontal disease. This sad case highlights many different concerns that practitioners need to consider, including routinely resorting to the use of antibiotics in treating infections, the recognition of the ongoing presence of common oral pathogens, the risk of secondary infection that may result from a routine periodontal procedure, and the importance of dental professionals partner with their patients to ensure they are prepared to properly perform their own oral care and stay motivated to continue treatment and perform proper home care.

The patient regularly visited the periodontist as scheduled for scaling and curettage procedures. Often during these visits, the periodontist noticed purulent pus discharges from her gingival sulks. Such discharges are rarely associated with normal wound-healing as they typically drain white blood cells, dead bacteria, inflamed cells all clear signs of infection. Upon her regular visits the patient would inform the periodontist of any sulcular discharge; when so informed the periodontist would prescribe antibacterial rinses.

During her last visit, this periodontist observed and noted a purulent discharge, and the hygienist also charted patient having multiple 6mm to 8mm pockets. She was given local anesthesia and the hygienist performed deep scaling and curettage. The patient did not receive home oral hygiene instruction but was scheduled to return in a month for a follow-up visit. While scaling and root planning are intended to remove plaque and calculus, they may leave the patient vulnerable to secondary infection, and bacteria regrow within the protective environment of biofilms over infected tissues in a matter of hours or days [1,2].

Eight days later, the patient had a seizure and was taken to a regional medical center. Seizure may involve loss of consciousness, confusion, muscle spasms, and drooling or frothing at the mouth. Because the patient evidenced symptoms of seizure, doctors at the medical center kept her at the facility and ordered a neurological

evaluation. Radiological studies determined the patient had intracranial fluid accumulation, an emergency craniotomy revealed the fluid accumulation to be pus, stemming from a brain abscess. When the cranial fluid was cultured and tested, *Treponema denticola*, a well-established gram negative periodontal pathogen was identified [3].

Once the bacterium was isolated the patient was placed on an IV Penicillin derivative. She was hospitalized for two additional weeks. Next, she received a month of physical and occupational therapy. While the patient's recovery was reasonably good, she lost some working memory, mental flexibility, self-control and had a permanent sense of imbalance. These consequences of the seizure ended her career in professional photography, a principal source of her livelihood. The periodontist and the patient arrived at a monetary settlement out of court.

T. denticola is a motile and highly proteolysis spirochete that resides in complex polymicrobial ecology as are found in biofilms of the periodontium. There it interacts with other oral pathogens, such as *Porphyromonas gingivalis*. The interaction of oral pathogens within the inert polysaccharide surface of the biofilms, allowing further bacteria to colonize the oral cavity without being affected by saliva flow [4]. Oral hygiene instruction (OHI) and regular home oral care become essential to inhibiting the overgrowth of gram-negative anaerobic bacteria within the protective, growing biofilms matrix.

The basis of the patient's legal case was that the periodontist was negligent in "failing to detect the presence of infection and failing to adequately treat it as a part of his periodontal treatment" [3]. This inaction allowed the infection to travel to the brain and grow, leaving the patient with permanent disabilities. Upon questioning, the periodontist testified that in his opinion there was no need to prescribe antibiotics to the patient. "However, when asked for the definition of periodontitis, he stated that it is an infection of the tissues surrounding and supporting the teeth, and he agreed that the presence of purulence defined that infection as acute" [3].



Antibiotics typically are prescribed to counteract on bacterial isolate, such as *T. denticola*. However, bacteria reside in biofilms adherent to infected as well as healthy tissues, and antibiotics may not be effective in treating polymicrobial communities. Also, antibiotics do not clear biofilms. Hence, the importance of OHI and good home oral care using products capable of compromising oral biofilms becomes an important part of an effective treatment plan.

Can you imagine a day when antibiotics don't work anymore? It's concerning to think that the antibiotics that we depend upon for everything from skin and ear infections to life-threatening bloodstream infections could no longer work. Unfortunately, the threat of untreatable infections is very real.

Antibiotic resistance occurs when germs outsmart drugs. In today's healthcare and community settings, we are already seeing germs stronger than the drugs we have to treat them. This is an extremely scary situation for patients and healthcare workers alike.

So, what is fueling antibiotic resistance, you may ask? We're finding that the widespread overuse and incorrect prescribing practices are significant problems. In addition to driving drug resistance, these poor practices introduce unnecessary side effects, allergic reactions, and serious diarrheal infections caused by *Clostridium difficile*. These complications of antibiotic therapy can have serious outcomes, even death.

View larger graphic

According to Centers for Disease Control (CDC) National Healthcare Safety Network, the number of secondary infections from healthcare procedures is growing rapidly due to the increasing number of bacteria that develop resistance to antibiotics, including methicillin-resistant *Staphylococcus aureus*, vancomycin-resistant *Enterococcus*, extended-spectrum cephalosporin-resistant *Klebsiella pneumoniae* and *Klebsiella oxytoca*, and carbapenem-resistant *Pseudomonas aeruginosa*, *K. pneumoniae*, *K. oxytoca*, *Escherichia coli*, and *Enterobacter* [5].

Spiegel & Loffler [3] assert that the use of antibiotics in treating periodontal disease should be professionally determined on a case by case basis. Due to the increasing incidence of resistant bacterial strains, they urge practitioners to avoid using antibiotics for preventative care. However, acute infections should be treated before any type of invasive procedure is performed. In the patient's case, the presence of purulence should have been the reason to

prescribe a course of antibiotics prior to the periodontal cleaning, thus reducing the chance for a secondary infection following treatment. It is important to note, that *T. denticola* is a common oral pathogen that is a continuous resident in the mouth, particularly in biofilms, as such, its eradication is not a realistic objective. Antibiotics can help to control the bacteria while they are being taken, however, once discontinued, overgrowth of the oral pathogen is likely to return. This likelihood makes the partnership between the dental professional and the patient extremely important.

According to the CDC, dental professionals should prescribe antibiotics correctly. They should begin with getting cultures before making prescriptions, carefully choosing the appropriate drug for the condition, the right dosage for the treatment plan, and the correct duration for the treatment plan. Failure to do so can encourage resistance. Prescriptions should be reassessed within 48 hours of their initiation –again using culture testing and a patient exam [5]. This protocol needs to be incorporated into the standard of care for the practice.

During treatment, the dental professional's goal is to thoroughly clean the pockets around teeth to prevent damage to the surrounding bone [6]. Scaling, root planning and topical antibiotics can all help to remove bacteria. Following treatment, it is important for the patient to be completely informed as to not only how important their daily home oral care is but also the proper methods of home oral care. They must also be informed about how vital it is to keep their regularly scheduled periodontal treatment appointments. It is important for the dental professionals to develop solid relationships with their patients, in order for the patients to be motivated and to stay motivated to participate in their own oral health recovery plan.

References

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